

This listing of claims will replace all prior versions, and listings, of claims in the application:

1 Claim 1 (currently amended): A focusing apparatus
2 comprising:
3 a distance-measuring device which measures distances
4 of a plurality of points in a photographing field based
5 on a principle of triangular distance measurement to
6 detect a subject which is the closest to the focusing
7 apparatus, of subjects in the photographing field;
8 a photographing lens;
9 a driving mechanism which drives the photographing
10 lens along an optical axis;
11 an image pickup device which receives a subject
12 light flux incident via the photographing lens to output
13 a subject image signal; and
14 a CPU which controls the driving mechanism to drive
15 the photographing lens along the optical axis, while
16 thereby detecting a contrast of the subject image signal
17 in a plurality of image pickup areas corresponding to the
18 plurality of points and which thereafter adjusts a focal
19 position of the photographing lens in a position which
20 has a highest contrast of the subject image signal in an
21 image pickup area corresponding to a point indicating a
22 shortest distance of an output of the distance-measuring
23 device in the plurality of points.

1 Claim 2 (original): The apparatus according to claim 1,
2 wherein the distance-measuring device detects a
3 brightness in the plurality of points, and

4 the image pickup device sets an integration
5 time in the plurality of image pickup areas based on the
6 detected brightness.

Claims 3 and 4 (canceled)

1 Claim 5 (currently amended): A focusing apparatus
2 comprising:
3 an image pickup device including a plurality of
4 image pickup areas;
5 a focusing lens including an optical path via which
6 a subject light flux is incident upon the image pickup
7 device;
8 a focusing section which determines a plurality of
9 focusing lens positions from a relation between the
10 position of the focusing lens and a contrast of a subject
11 image signal obtained on the image pickup device via the
12 focusing lens;
13 a distance-measuring section which obtains the
14 position of a subject in a photographing field and a
15 distance to the subject ~~by the subject light flux~~
16 ~~incident via an optical path different from that of the~~
17 ~~focusing lens; and~~
18 a calculation control section which obtains a
19 plurality of combinations of the focusing lens position
20 and the image pickup area for use at the time of the
21 focusing by the position and distance of the subject
22 obtained by the distance-measuring section; and
23 a control section which stops the focusing lens in
24 the plurality of focusing lens positions in accordance
25 with the plurality of combinations and which obtains the
26 contrast of the subject image signal outputted from the

27 image pickup area of the combination corresponding to
28 each focusing lens position and the contrast of the
29 subject image signal outputted from the image pickup
30 device in all the areas of the image pickup device to
31 determine the position of the focusing lens.

Claim 6 (canceled)

1 Claim 7 (original): The apparatus according to claim 5,
2 wherein the distance-measuring section includes a divided
3 sensor array, and determines charge accumulation
4 conditions of the image pickup device at the time of the
5 obtaining of a change in the contrast by the output of
6 the sensor array disposed in the distance-measuring
7 section.

1 Claim 8 (currently amended): A focusing apparatus
2 comprising:
3 a photographing lens;
4 an image pickup section which detects outputs a
5 subject image incident via the photographing lens, and
6 detects contrast information regarding an entire area of
7 a photographing field and part of the entire area of the
8 photographing field;
9 an optical system which is different from the
10 photographing lens;
11 a distance-measuring section which uses the optical
12 system different from the photographing lens to measure a
13 subject distance or performs measurement to determine a
14 focal position with respect to a plurality of points in a
15 photographing field; and

16 a determining section which focuses moves the
17 photographing lens ~~on~~ to a plurality of focal positions
18 corresponding to a plurality of distance measurement
19 results of the distance-measuring section and which
20 determines an area to execute a final mountain climbing
21 AF based on ~~contrasts obtained at the plurality of focal~~
22 ~~positions and the distance measurement results the~~
23 contrast information detected by the image pickup section
24 and the focal position determined by the distance
25 measuring section.

1 Claim 9 (currently amended): A camera including a
2 focusing apparatus, comprising:
3 an irradiation device which selectively switches
4 irradiation and non-irradiation of a subject with an
5 auxiliary light for distance measurement;
6 a photographing lens;
7 a driving circuit which drives the photographing
8 lens along an optical axis direction;
9 an image pickup device which receives a light flux
10 incident from the subject via the photographing lens to
11 output a subject image signal;
12 an image processing circuit which processes the
13 subject image signal outputted from the image pickup
14 device;
15 a distance-measuring device which includes a pair of
16 optical systems and a pair of sensors for distance
17 measurement to detect a plurality of subject images
18 incident via the pair of optical systems and which
19 outputs information associated with a subject distance
20 based on the plurality of subject images detected by the
21 sensors for distance measurement and which detects the

22 plurality of subject images in a case where the subject
23 has a low brightness; and
24 a CPU which selectively executes a first auto-focus
25 operation of detecting a contrast state based on the
26 subject image signal processed by the image processing
27 circuit to adjust a focus of the photographing lens, a
28 second auto-focus operation of performing a
29 distance-measuring operation by the distance-measuring
30 device in a non-irradiation state of the auxiliary light
31 for distance measurement to adjust the focus of the
32 photographing lens in accordance with a result of the
33 distance-measuring operation, and a third auto-focus
34 operation of performing the distance-measuring operation
35 by the distance-measuring device in an irradiation state
36 of the auxiliary light for distance measurement to adjust
37 the focus of the photographing lens in accordance with
38 the result of the distance-measuring operation,
39 wherein the CPU first executes the second auto-focus
40 operation, and then executes the first auto-focus
41 operation, when the main subject is separated from the
42 camera by a distance shorter than a predetermined
43 distance after the second auto-focus operation, and
44 executes the third auto-focus operation, when an output
45 of each of the sensors for distance measurement has a
46 level lower than a predetermined level after the second
47 auto-focus operation.

1 Claim 10 (original): The camera according to claim 9,
2 wherein the CPU judges whether or not the subject
3 indicates the low brightness and executes any of the
4 first, second, and third auto-focus operations in
5 accordance with the result of the judgment.

1 Claim 11 (original): The camera according to claim 10,
2 wherein the CPU executes the second auto-focus operation
3 and judges that the subject indicates the low brightness,
4 when the output of the sensors for distance measurement
5 indicate a level not more than a predetermined level as a
6 result of the second auto-focus operation.

1 Claim 12 (original): The camera according to claim 11,
2 wherein the CPU executes the third auto-focus operation,
3 when the subject is judged to indicate the low
4 brightness.

1 Claim 13 (original): The camera according to claim 9,
2 wherein the CPU executes the second auto-focus operation,
3 and executes the first auto-focus operation, when the
4 subject is judged to exist in a distance shorter than a
5 predetermined distance.

1 Claim 14 (currently amended): A camera including a
2 focusing apparatus, comprising:
3 a photographing lens;
4 an image pickup device which picks up a subject
5 image by using the photographing lens;
6 a first auto-focus section which adjusts a focus of
7 the photographing lens based on a contrast of a subject
8 image obtained via the photographing lens;
9 a pair of optical systems which are different from
10 the photographing lens;
11 a second auto-focus section which adjusts the focus
12 of the photographing lens based on a pair of subject
13 images obtained via the pair of optical systems;

14 a flash light irradiating section which irradiates a
15 subject with a flash light;
16 a judging section which judges whether or not an
17 auto-focus operation by the first auto-focus section is
18 appropriate, based on contrast of the subject images; and
19 a control section which operates the first
20 auto-focus section, when the judging section judges that
21 the auto-focus operation by the first auto-focus section
22 is appropriate and which operates both the second
23 auto-focus section and the flash light irradiating
24 section, when the judging section judges that the
25 auto-focus operation by the first auto-focus section is
26 inappropriate.

Claims 15-20 (canceled)

1 Claim 21 (currently amended): A camera including a
2 focusing apparatus, comprising:
3 a photographing lens;
4 an image pickup device which acquires a subject
5 image signal via the photographing lens;
6 a first auto-focus section which performs focusing
7 of the photographing lens based on a contrast of the
8 subject image signal acquired by the image pickup device;
9 ~~a pair of optical systems which are different from~~
10 ~~the photographing lens;~~
11 a distance-measuring device which uses a pair of
12 subject image signals acquired via ~~the~~ a pair of optical
13 systems to perform distance measurement;
14 a second auto-focus section which performs the
15 focusing of the photographing lens in accordance with a

16 distance measurement result of the distance-measuring
17 device;
18 a flash light irradiating section which irradiates a
19 subject with a flash light;
20 a judging section which judges whether or not the
21 pair of subject image signals obtained via the pair of
22 optical systems or the subject image signal acquired by
23 the image pickup device is appropriate for a
24 distance-measuring operation of the distance-measuring
25 device; and
26 a control section which irradiates the subject with
27 the flash light in accordance with a judgment result of
28 the judging section by the flash light irradiating
29 section and which performs the focusing of the
30 photographing lens preferentially by the second
31 auto-focus section.

1 Claim 22 (original): A camera including a focusing
2 apparatus, comprising:
3 a flash section which irradiates a subject with
4 an auxiliary light;
5 a photographing lens;
6 a contrast type focusing section which acquires
7 a subject image signal at the time of displacement of the
8 photographing lens by a micro amount via the
9 photographing lens and which determines a focusing
10 position in accordance with a contrast change of the
11 acquired subject image signal to control the focusing of
12 the photographing lens;
13 an optical system which is different from the
14 photographing lens;

15 a distance-measuring section which acquires
16 a plurality of subject image signals via the optical
17 system different from the photographing lens to measure a
18 distance of the subject based on the acquired plurality
19 of subject image signals; and

20 a control section which determines whether to
21 continue focusing control by the contrast type focusing
22 section or to change to the focusing control to determine
23 the focusing position based on the distance measured by
24 the distance-measuring section, based on the plurality of
25 subject image signals acquired by the distance-measuring
26 section when the subject is irradiated with the auxiliary
27 light by the flash section.

1 Claim 23 (original): The camera according to claim 22,
2 wherein the control section controls the irradiation of
3 the subject with the auxiliary light by the flash section
4 and controls the focusing by the contrast type focusing
5 section, when the distance of the subject measured by the
6 distance-measuring section is shorter than
7 a predetermined value at the time of the irradiation with
8 the auxiliary light by the flash section, and the
9 contrast of the plurality of subject image signals
10 acquired by the distance-measuring section is larger than
11 a predetermined value.

1 Claim 24 (original): A camera including a focusing
2 apparatus, comprising:
3 a photographing lens;
4 a driving mechanism which drives the photographing
5 lens along an optical axis direction;

6 an image pickup device which receives a subject
7 light flux incident via the photographing lens to output
8 the subject image signal;

9 an image processing circuit which processes the
10 subject image signal outputted from the image pickup
11 device;

12 a distance-measuring device which includes a pair of
13 optical systems and a pair of sensors for distance
14 measurement to detect a pair of subject images incident
15 via the pair of optical systems and which outputs
16 information associated with a subject distance based on
17 the subject images detected by the sensors for distance
18 measurement; and

19 a CPU which detects the subject image signal
20 processed by the image processing circuit or a brightness
21 distribution of the pair of subject images detected by
22 the sensors for distance measurement to select either one
23 of the first and second auto-focus operations based on
24 the detection result and which selectively executes a
25 first auto-focus operation of detecting a contrast based
26 on the subject image signal processed by the image
27 processing circuit to adjust a focus of the photographing
28 lens, and a second auto-focus operation of performing a
29 distance-measuring operation by the distance-measuring
30 device to adjust the focus of the photographing lens in
31 accordance with a result of the distance-measuring
32 operation.

1 Claim 25 (currently amended): A camera including a
2 focusing apparatus, comprising:

3 a photographing lens including a diaphragm
4 mechanism;

5 an image pickup section which includes an image
6 pickup device to photograph a subject image incident via
7 the photographing lens to obtain a subject image signal;
8 a setting section which sets conditions of an image
9 pickup operation by the image pickup section;
10 a first auto-focus section which focuses the
11 photographing lens from a contrast of the subject image
12 signal obtained by the image pickup section;
13 ~~a pair of optical systems for distance measurement~~
14 ~~which are different from the photographing lens,~~
15 a distance-measuring section which includes a pair
16 of sensors for distance measurement to acquire a pair of
17 subject image signals via ~~the~~ a pair of optical systems
18 for distance measurement and which performs a
19 distance-measuring operation to calculate a subject
20 distance from the pair of subject image signals;
21 a second auto-focus section which focuses the
22 photographing lens based on the distance measurement
23 result of the distance-measuring section;
24 a selecting section which detects the subject image
25 signal obtained by the image pickup device or a
26 brightness distribution of the pair of subject image
27 signals obtained by the sensors for distance measurement
28 to select either one of the first and second auto-focus
29 sections in accordance with a ratio of a low-brightness
30 portion in the detected brightness distribution; and
31 a change section which changes the conditions of the
32 distance-measuring operation set by the setting section,
33 when the selecting section selects the second auto-focus
34 section.

1 Claim 26 (original): The camera according to claim 25,
2 wherein the conditions of the image pickup operation set
3 by the setting section include at least aperture value
4 information of the diaphragm mechanism, shutter speed
5 information of a shutter to expose an image pickup plane
6 of the image pickup device, and sensitivity information
7 of the image pickup device.

8

9 Claim 27 (original): The camera according to claim 26,
10 wherein the change section changes the aperture value
11 information and the sensitivity information set by the
12 setting section.

1 Claim 28 (original): The camera according to claim 27,
2 wherein the change section the aperture value information
3 so as to narrow down the diaphragm mechanism by a value
4 larger than that in the aperture value information set by
5 the setting section and changes the sensitivity of the
6 image pickup device so as to raise the sensitivity of the
7 image pickup device.

1 Claim 29 (currently amended): A camera including a
2 focusing apparatus, comprising:
3 a photographing lens;
4 a first auto-focus section which includes an image
5 pickup device to obtain a contrast of a subject image
6 signal obtained via the photographing lens and which
7 adjusts a focus of the photographing lens based on the
8 contrast of the subject image signal obtained by the
9 image pickup device;
10 ~~a pair of optical systems which are different from~~
11 ~~the photographing lens,~~

12 a second auto-focus section which includes
13 a distance-measuring device to perform a
14 distance-measuring operation based on a pair of subject
15 image signals obtained via ~~the~~ a pair of optical systems
16 and which adjusts the focus of the photographing lens in
17 accordance with the output of the distance-measuring
18 device;

19 a detecting section which detects the subject image
20 signal obtained by the image pickup device or a
21 brightness distribution of the pair of subject image
22 signals obtained by the distance-measuring device; and

23 a change section which selects the second auto-focus
24 section in accordance with a ratio of a low-brightness
25 portion of a brightness distribution detected by the
26 detecting section and which changes an aperture value of
27 the diaphragm mechanism in the photographing lens and a
28 sensitivity of the image pickup device.

Claims 30-32 (canceled)